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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,260	03/16/2004	Frank J. Cunha	EH-11037A	4311

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EXAMINER

EDGAR, RICHARD A

ART UNIT	PAPER NUMBER
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3745

DATE MAILED: 10/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/802,260

Applicant(s)

CUNHA ET AL.

Examiner

Richard Edgar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6, 8-13, 16 and 18-24 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 7, 14, 15 and 17 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/04 & 7/05</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

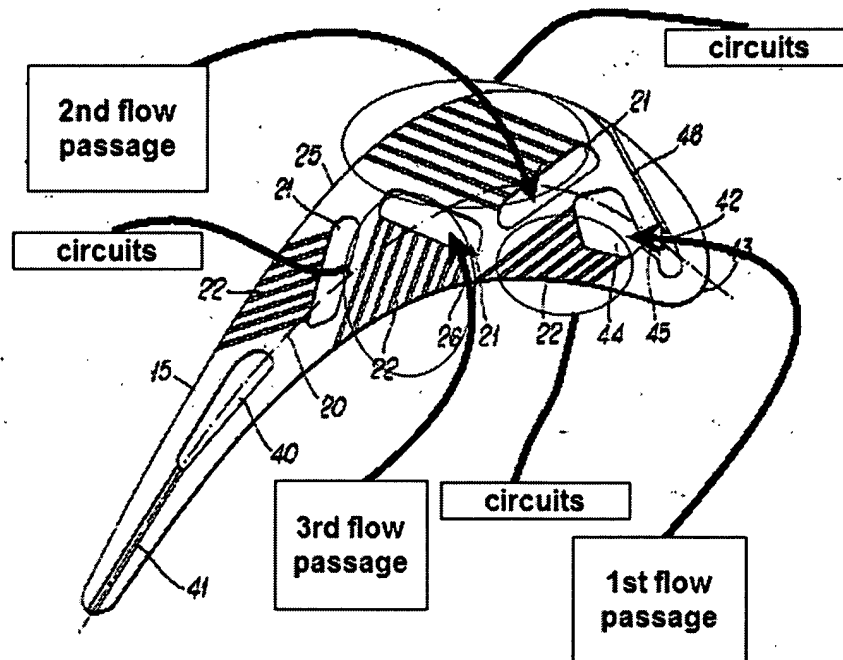
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6, 8-11, 13, 16, 18-21, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 3,801,218 (Moore hereinafter) in view of United States Patent Application Publication No. 2002/0021966 (Kvasnak et al. hereinafter).

Moore teaches a turbine airfoil 15, comprising: pressure and suction sidewalls extending longitudinally in span from a root to a tip, and extending in chord between leading and trailing edges, said sidewalls being spaced laterally apart between said leading and trailing edges (see Figs. 1-3) wherein said airfoil defines a first flow passage 44 and a second flow passage 21, said first and second flow passages for flowing coolant fluid therethrough; a plurality of cooling circuits 22 embedded within said

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pressure sidewall, wherein each of said cooling circuits includes: an inlet, said inlet provides a cooling flow path from said first flow passage into each of said cooling circuits, and an exit aperture, said exit aperture provides a cooling flow path out of each of said cooling circuits to a region outside of the airfoil; and a plurality of cooling circuits embedded within said suction sidewall, wherein each of said cooling circuits embedded within said suction sidewall includes: an inlet, said inlet provides a cooling flow path from said second flow passage into each of said cooling circuits embedded within said suction sidewall, and an exit aperture, said exit aperture provides a cooling flow path out of each of said cooling circuits embedded within said suction sidewall to said region outside the airfoil (see annotated Figure below taken from Moore); wherein said first flow passage is not in flow communication with said cooling circuits embedded within said suction sidewall and said second flow passage is not in flow communication with said cooling circuits embedded within said pressure sidewall such that said first flow passage feeds the coolant fluid to said cooling circuits that are embedded only within said pressure sidewall and said second flow passage feeds the coolant fluid to said cooling circuits that are embedded only within said suction sidewall .



Moore shows a third flow passage disposed downstream said second passage and upstream said trailing edge, said third flow passage for flowing coolant fluid therethrough; wherein said third flow passage is not in flow communication with said cooling circuits embedded within said suction sidewall such that said third flow passage feeds the coolant fluid to a portion of said cooling circuits that are embedded within said pressure sidewall (see annotated Figure above taken from Moore).

Each of the cooling circuits embedded within the suction sidewall and the pressure sidewall is a film cooling slot (see Moore col. 3, lines 47-49).

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The cooling circuits occupy an area smaller than 0.06 in^2 (see col. 2, lines 62-63).

The coolant comprises air (see Moore col. 1, lines 61-64).

The airfoil is arranged along a longitudinal axis and the flow passages extend longitudinally between the sidewalls (see Fig. 3).

Since Moore teaches the circuits may be slots, radially extending (col. 3, lines 47-49), the slots are race-track shaped (oval) whose length in the radial direction is greater than its width transverse to such direction.

Moore does not show a partition separating the pressure and suction sides of the airfoil.

Kvasnak et al. show in Fig. 4, a turbine airfoil having cooling flow passages 42 extending longitudinally through the airfoil, wherein a partition is provided between the pressure and suction sides of the airfoil for the purpose of increasing the cross-sectional area of the passages 42 while supporting the airfoil shape.

Since Moore teaches longitudinally extending cooling passages in a turbine airfoil, and Kvasnak et al. teach that the cross-sectional area of longitudinally extending passages in airfoils may be maximized by using a partition between the sidewalls, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the Moore cooling configuration so that the cross-sectional shape of the longitudinally extending passages were maximized by providing a

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partition between the airfoil sidewalls, as taught by Kvasnak et al. for the purpose of increasing the cross-sectional area of the passages while supporting the airfoil shape.

Claims 12 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 3,801,218 (Moore hereinafter) in view of United States Patent Application Publication No. 2002/0021966 (Kvasnak et al. hereinafter) as applied to claims 10 and 20, respectively, above, and further in view of United States Patent No. 6,331,217 (Burke et al. hereinafter).

Moore in view of Kvasnak et al. teach a turbine blade have cooling passages therein, but do not teach that the blade is fabricated from a nickel-based alloy.

Burke et al. show in Table 1 that turbine blades are nickel-based for the purpose of withstanding the high operating temperatures in a turbine.

Since the Moore in view of Kvasnak et al. turbine blade is used in a turbine engine subjected to high temperatures, and Burke et al. teaches that a nickel-based alloy blade can withstand high temperatures in a turbine component, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to make the blade of Moore in view of Kvasnak et al. from a nickel-based alloy, as taught by Burke et al. for the purpose of withstanding the high operating temperatures in a turbine.

Allowable Subject Matter

Claims 4, 5, 7, 14, 15 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 4 and 14 each require the slots to be staggered relative to each other, whereas the Moore reference is silent with respect to the relative spacing between the elongated slots (col. 3, lines 47-49). One having ordinary skill in the art would not stagger the disclosed slots of Moore without Applicants' disclosure since Moore does not discuss the relative relationship between adjacent slots.


Regarding claims 5, 7, 15 and 17, each of these claims requires a second inlet spaced radially from the first inlet for each cooling circuit. Moore only shows passages having a constant area, and does not fairly suggest a second inlet for each circuit. Kvasnak et al. similarly only show one inlet 40 per circuit, without the suggestion of a radially spaced second inlet. One having ordinary skill in the art would not be motivated to add a second inlet in each circuit without Applicants' disclosure, especially since the Kvasnak et al. inlet is radially centered with respect to the circuit.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Edgar whose telephone number is (571) 272-4816. The examiner can normally be reached on Mon.-Thur. and alternate Fri., 7 am- 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Richard Edgar
Examiner
Art Unit 3745

RE